

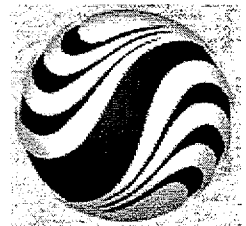
**APPENDIX D – DRAINAGE ANALYSIS EXECUTIVE SUMMARY**  
Safford Regional Airport Master Plan Update

**EXECUTIVE SUMMARY**

***DRAINAGE REPORT FOR  
SAFFORD REGIONAL AIRPORT  
MASTERPLAN UPDATE***

***Prepared for:  
CITY OF SAFFORD***

***Prepared by:  
STANTEC CONSULTING, INC.  
8211 S. 48<sup>th</sup> Street  
Phoenix, AZ 85044  
(602) 438-2200***



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## **1.0 INTRODUCTION**

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### **1.1 Scope**

The purpose of the Drainage Report is to identify and analyze the existing drainage conditions for on-site and off-site watersheds for Safford Regional Airport. This Executive Summary provides an overview of the pertinent information provided in the Drainage Report.

### **1.2 Location**

Safford Regional Airport is located in Southeastern Arizona approximately four miles northeast of Safford, Arizona in the Gila Valley at the base of the Gila Mountains. It is located in a portion of Sections 1 and 6, Township 7 East, Range 26 East and Range 27 East of the Gila and Salt River Base and Meridian, Graham County, Arizona.

### **1.3 Description**

Safford Regional Airport is currently an uncontrolled airport with two intersecting runways. Runway 30-12 is 6,000 feet long and 100 feet wide, and Runway 8-26 is 4,800 feet long and 75 feet wide, each with corresponding 35 foot wide parallel taxiways. The existing airport was established by the United States Army Air Forces in November 1941 as a training site during World War II. The City of Safford officially obtained the airport in March 1946. In addition to the runways and taxiways, the airport consists of parking aprons, terminal, fuel island, hangars and residences and storage buildings.

The City of Safford is anticipating the need to expand the airport facilities for airside and landside facilities. Airside facilities are those directly related to the arrival and departure of aircraft, including runways,

taxiways, navigational aids, markings, airport lighting and aircraft parking. Landside development would consist of all other improvements, including terminal buildings, service and access roads, security, fixed base operations (FBO) facilities, utilities and automobile parking.

Safford Regional Airport is located approximately four miles south of the Gila Mountains and is situated between three major washes. Tidwell Wash is located east of the airport, Lone Star Wash is located northwest of the airport, and Dry Lake Wash is located west of the airport. Tidwell and Lone Star Washes convey the majority of the Gila Mountain runoff around the airport toward the Gila River. Dry Lake Wash conveys off-site runoff west of the airport toward the Gila River. An off-site area between Lone Star and Tidwell Washes contribute runoff toward the north boundary of the airport. There is currently a berm along the north section line of the airport boundary which protects the airport from these off-site flows. The berm conveys the off-site flows toward the west and eventually outlets into Dry Lake Wash. On-site runoff around the unimproved perimeter is managed by dirt channels and within the improved areas by culverts and storm drain systems. The ultimate outfall of the on-site runoff is west and south.

## **2.0 DRAINAGE**

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### **2.1 Hydrology**

The existing condition hydrology was analyzed using the methodology outlined in the ADOT Hydrology Design Manual as allowed by FAA Airport Drainage Advisory Circular. The Army Corps of Engineers HEC-1 computer program was used on watershed areas greater than 160 acres and the Rational Method was used for areas less than 160 acres.

Two subbasins greater than 160 acres were analyzed using the HEC-1 computer program. The USGS topographic map, Safford quadrangle was used in delineating subbasins. The precipitation values for the Safford Regional Airport area were computed using the method outlined in Chapter 1 of the ADOT Hydrology Manual. The computer program known as PREFRE was used in developing a rainfall depth-duration-frequency table for coding into the HEC-1 PH card. The rainfall losses were computed using the Green and Ampt method. The soils and vegetation is described in the "Final Safford Regional Airport Master Plan Update" and the "Soil Survey - Safford Area, Arizona". The soil around the airport is described as a Continental-Pinaleno Complex (CtB), which is defined as a sandy loam with 0-5 percent slopes (Soils Map, Figure 5). The soils description best fits the definition of soil group B. The vegetative cover is approximately 20%. The HEC-1 model was run for the 2-, 5-, 10-, 25-, 50- and 100-year storm events.

The Rational Method was used for smaller areas between the runways and taxiways to analyze the existing hydrology at key concentration points. A 200 scale aerial photo was used to delineate the subbasins. Time of concentration was estimated using equation 2-2 of the ADOT Hydrology Manual. Minimum and maximum time of concentrations used are 10.0 and 60.0 minutes, respectively. Runoff coefficient (C-value) were estimated using Figures 2-3 and 2-5 of the ADOT Hydrology Manual for the graded dirt area and impervious area. The graded dirt area was assumed to be similar to an upland rangeland as described in the ADOT Hydrology Manual. In subbasins where the dirt and impervious areas are combined, a weighted C-value was computed.

## **2.2 Hydraulics**

The existing culverts under the runways, taxiways and roadways are located at points throughout the airport to convey stormwater runoff into channels which outlet off-site toward the south and west. An existing catch basin and pipe storm drain system also exists to drain runoff toward the southwest into a channel. In late 1995, the terminal apron was improved. The Drainage Report which accompanied the apron improvement plans, indicates that this catch basin and pipe storm drain system had also been improved to safely convey the additional apron runoff.

The Hydraulic Design of Culverts manual was used in determining the inlet flows of the culverts located throughout the airport, using inlet control nomograph and assuming a cover over the pipe. The grate inlets of the catch basins were analyzed using the weir equation and a clogging factor of 25% for grates on the apron and 50% for grates in the dirt areas. The hydraulic grade line for the catch basin and pipe system was computed using a computer program called StormCad by Haestad.

## **3.0 CONCLUSIONS**

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A field visit was conducted on April 1, 1998 to verify drainage patterns and to take photographs of the existing drainage system.

In its current configuration, the Safford Regional Airport drainage layout can safely convey on-site and off-site flows for the 5-year storm event per the FAA criteria through and around the airport. Based on the drainage report for the apron reconstruction, the airport aerial photo, and field visit, there does not seem to be any flooding problems or excessive ponding at the catch basins or culvert inlets.

In the event of a storm greater than a 5-year event, there is a possibility of flooding problems occurring due to the ends of the culverts and catch basin grates becoming clogged with debris and sediment, and excessive vegetation in the vegetation within drainage channels. Another potential flooding hazard can be caused by damaged culvert ends by decreasing the design inlet capacity of the pipes.

#### **4.0 RECOMMENDATIONS**

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It is recommended that cleaning all debris, vegetation, and sediment from catch basin grates, inlets and outlets of culverts and drainage channels continually maintain the current drainage system. In addition, repair all damaged culverts with the next available improvement phase.

The Airport Master Plan will recommend several improvements in anticipation of growth in the Safford area. The improvements will be constructed in phases as growth continues. The Drainage Report of the existing conditions will serve as a foundation for preparing an improvement in conjunction with the new Airport Master Plan.